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AUTHOR Todd, Robert F.; Reece, Carol Carter
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ABSTRACT

A diversity of practices exists with regard to the actual content taught in graduate-level courses in introduction to educational research. In a recent Delphi study, a national panel of 21 experts in educational research generated a list of 114 skills and knowledge areas they considered worthy objectives in an introductory course. What remained missing in the Delphi study was an answer to the question, "What is the relationship between what experts say should be taught in an introductory course and what is actually required in practice?" This study is an attempt to address this question. In addition to course content requirements, demographic information was collected to answer questions about who teaches the course and how they view its purpose. Results are displayed in tables. Three appendixes contain the following information: (1) the 114 skills identified by the Delphi panel; (2) the names of the members of the Delphi Panel; and (3) the reserach skills and knowledge areas questionnaire. (JD)

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Graduate Introductory Educational Research Courses: A Look at What Is Required

Robert F. Todd and Carol Carter Reece

Memphis State University

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Paper presented at the annual meeting of the

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Graduate Introductory Educational Research Courses: A Look at What Is Required

A significant number of authors of introductory texts in educational research state in the preface to their books that their aim is to prepare students to become consumers of research. Consequently, considerable attention is given to procedures on how to analyze research approaches, how findings may be generalized, and how the rationale for a study may be justified--in other words, how to critically evaluate a research report. Others view the course as utilitarian, leading to a research project, usually a master's thesis. Still others perceive the course not only as an introduction to the research process but also as a prerequisite to a statistics course or an advanced educational research course or seminar. Although course syllabi detail the objectives for such courses, they tend to be rather general, and instructors even in the same department who have responsibility for the course have been known to diverge from a common, department-adopted syllabus.

There exists, apparently, a diversity of practices with regard to the actual content taught in graduate level courses in introduction to educational research, despite the fact that stated goals and objectives as well as content in many commonly adopted textbooks reflect much homogeneity.

In a recent Delphi study by Todd and Reece (1989) a national panel of 21 experts in educational research nominated by the members of the Special Interest Group: Professors of Educational Research (SIG: PER) of

the American Educational Research Association generated a list of 114 skills and knowledge areas they considered worthy objectives in an introductory course. Those 114 skills and knowledge areas appear in Appendix A. The names of the 21 panel members are listed in Appendix B. Of those 114 skills and knowledge areas (hereafter referred to simply as "skills") 59 were found to be "Essential,""Essential-Important," or "Important." The panel reached a consensus (a majority of 11 constituted a consensus) that 38 of the skills were considered "Essential," 8 were determined to be "Essential-Important," and 13 were said to be "Important." These 59, shown in Tables 1, 2, and 3 below were skills that the panel felt anyone should possess who had satisfactorily completed an introductory course in educational research.

Purpose

What remained missing in the Delphi study was an answer to the question "What is the relationship between what experts say should be taught in an introductory course and what is actually required in practice?" The present study represents an attempt to address this question. In addition to course content requirements, demographic information was collected to answer questions about who teaches the course and how they view its purpose. These questions are displayed in Appendix C with results reported in Table 4.

Method

The need existed to ask a group of professors of educational research to identify those skills that they actually require students to master in the introductory course. While it would have been desirable to obtain a random sample from all of the instructors throughout the country who teach such a course, that approach seemed impractical from the standpoint

of obtaining such a list of people. However, there does exist a small accessible population of professors who do teach an introductory educational research course.

The decision was made to survey that population, the membership of SIG: PER within the American Educational Research Association to determine their course requirements. This group consists of 139 members as determined from a mailing list for their newsletter. A basic assumption of the study was that these members would constitute a representative sample of professors who teach such a course. They are a group scattered throughout the country from 39 states, the Philippines, and Canada, representing institutions of various population sizes. A copy of the Questionnaire they were sent appears in Appendix C.

Findings

Of the 139 questionnaires mailed to the SIG: PER membership on September 27, 1989, 85 were returned for a response rate of 61 percent. A postcard follow-up was conducted two weeks later which brought the response rate to 111 or 80 percent. Twenty-five members did not return their questionnaires and the post office returned three because authorized time for forwarding their mail had expired. Of the 111 returned questionnaires, it was found that 11 of the respondents no longer teach an introductory research course, two had retired, two were reported as too ill to handle their correspondence, and one was reported as deceased. This left 95 or 86 percent useable returns.

Tables 1, 2, and 3 consist of the 59 skills and knowledge areas which the Delphi panel deemed "Essential," "Essential-Important," and "Important." Frequencies are displayed for the categories for both the Delphi panel and the population of the present study, the SIG: PER.

The number preceding each skill area represents the item as it appeared in the original Delphi questionnaire. See Appendix A. The first column to the right of the skill represents frequency of responses among the 21 Delphi panel members where a consensus was reached within a category.

In Table 2 items are listed for which no consensus was reached as being "Essential or "Important" but the frequencies were collapsed to show that a combination of responses exceeded the number required for consensus. These frequencies in Table 2 are reported as (E + I) in the Delphi panel column. Table 3 is presented in the same manner as Table 1.

In the last column to the right in each table, frequencies for the SIG: PER population are presented in rank order.

Table 1
Frequencies of Responses to Whether Each of the 59 Skills/Knowledge Areas Is Essential (Delphi Panel) and Is Taught (SIG: PER), Ranked

Original Item No. in Delphi Panel Questionnaire	Skill or Knowledge Area	Delphi* (N = 21) f	SIG: PER (N = 95) f
	ESSENTIAL (E)		
6.	Demonstrates an understanding of research terminology	19	93
16.	Understands what is involved in the Experimental Method of solving a research problem	20	93
3.	Can state a problem or question in such a way that it is amenable to the research process	19	92
13.	Can read journal articles and research reports with understanding	20	92
61.	Understands the concept of internal validity	21	92
1.	Understands what constitutes research	20	91
17.	Has knowledge of the types of variables that must be dealt with in a basic experimental design	19	91
64.	Understands the concept of external validity	21	91
2.	Understands what a scientific study involves	20	90
14.	Can formulate a testable hypothesis	17	90
4.	Knows how to operationalize variables	18	89
44.	Understands the meaning of correlation	19	89
93.	Can identify the type (method) of research represented by a particular study (experimental, etc)	16	89
18.	Understands and can explain differences between true experiments and quasi-experiments	17	88
24.	Has a familiarity with the various types of Descriptive Research Methods	18	88
62.	Can describe the threats to internal validity	19	87
98.	Understands the nature of causation and causal linkages	16	87
35.	Is familiar with measures of central tendency and knows when it is appropriate to use each	18	85
53.	Has an understanding of and can interpret levels of significance	16	85
65.	Can describe the threats to external validity	19	85
66.	Has an understanding of validity and the various types of validity	19	85

* Supplied from previous study for comparison purposes

(cont.)

Table 1 (continued)
Frequencies of Responses to Whether Each of the 59 Skills/Knowledge Areas Is Essential (Delphi Panel) and Is Taught (SIG: PER), Ranked

Original Item No. in Delphi Panel Questionnaire	Skill or Knowledge Area	Delphi (N = 21) f	SIG: PER (N = 95) f
8.	Can conduct a review of related literature	17	84
23.	Knows the difference between primary and secondary sources	16	84
40.	Has an understanding of the standard deviation	17	84
63.	Has an understanding of how design arrangements can reduce threats to internal validity	20	84
67.	Has an understanding of reliability and how it can be determined	17	84
21.	Can identify situations in which the Ex Post Facto approach would be effective	18	83
73.	Can critically evaluate a research report	21	83
38.	Has an understanding of variability in a distribution	17	82
69.	Knows the various components of a research proposal	17	81
5.	Can identify questions/problem statements that do not lend themselves to the scientific method of analysis	21	78
71.	Has an understanding of the basic ethical and legal considerations in conducting research	20	77
94.	Can interpret bias in design and testing	13	73
72.	Has developed a familiarity with research-oriented periodicals in his/her own field/area of interest	21	72
54.	Has an understanding of the t-test	17	69
75.	Can interpret charts and graphs	14	65
57.	Has an understanding of the F-ratio	11	58
74.	Has become a more critical listener	13	51

Table 2
Frequencies of Responses to Whether Each of the 59 Skills/Knowledge Areas Is Essential-Important (Delphi) and Is Taught (SIG: PER), Ranked

Original Item No. in Delphi Panel Questionnaire	Skill or Knowledge Area	Delphi (N = 21) f	SIG: PER (N = 95) f
	ESSENTIAL/IMPORTANT		
		(E+I)	
29.	Knows how to select a random sample	10+7	86
107.	Understands the logic underlying hypothesis testing	8+8	85
9.	Has familiarity with the Current Index of Journals in Education	9+8	74
105.	Is familiar with basic research resources such as Psychol. Abstracts, Sociol. Abstracts, Social Sciences Citation Index, and Education Index	7+9	72
79.	Appreciates the underlying assumptions/rationale of qualitative and quantitative methodologies	6+10	71
52.	Has an understanding of the concept of Type I and Type II errors	9+9	69
70.	Can actually write a research proposal including an organized review of literature	7+9	62
59.	Has an understanding of the Chi Square Test of Independence	10+8	56

Table 3
Frequencies of Responses to Whether Each of the 59 Skills/Knowledge Areas Is Important (Delphi Panel) and Is Taught (SIG: PER), Ranked

Original Item No. in Delphi Panel Questionnaire	Skill or Knowledge Area	Delphi (N = 21) f	SIG: PER (N = 95) f
	IMPORTANT		
		(I)	
15.	Understands the meaning of the null hypothesis and why it is written thus	15	89
19.	Has knowledge of the various sampling procedures	13	88
101.	Understands importance of research replication	13	85
102.	Understands the role of research in improving educational practice	12	85
99.	Understands problems of direction of causality in correlational research	11	80
97.	Can distinguish between a single-variable group design and a factorial design	11	75
7.	Can converse confidently with others about the research process	19	74
104.	Is familiar with basic research resources such as Ency. of Educ. Research, Review of Educ. Res., Review of Res. in Educ., & Handbook of Res. on Teaching.	13	71
109.	Can discuss why numerical analysis is useful	12	67
12.	Is familiar with the use of the Mental Measurements Yearbook	12	66
10.	Can use the Thesaurus of ERIC Descriptors	15	62
28.	Can identify weaknesses in opinionnaire statements	17	62
100.	Understands the various methods for summarizing different research studies on the same problem especially the method of meta-analysis	11	28

A KR-20 reliability coefficient for responses to the 59 skills was computed and found to be .89. It can be seen in Tables 1, 2, and 3 that a majority of the SIG: PER respondents agreed with the Delphi panel that these 59 skills were "Essential," "Essential-Important," and "Important" with the single exception of the last item in Table 3 (original Delphi questionnaire number 100) for which only 28 agreed that it is "Important."

Frequencies for demographic items in the questionnaire were tallied and frequencies of responses are displayed in Table 4. Eighty-seven of the 95 respondents either teach the course now (a majority of 53) or have taught it within the past five years (an additional 34).

About one-third of the respondents have taught the course more than 15 years, with a majority having taught it more than 10 years. An overwhelming majority (70%) view the course as quantitatively oriented.

A real division of opinion seems to exist with regard to whether the course should stand alone as indicated in Table 4 where 40 indicate the subject as an only course in research methodology and 46 indicate it as an introductory course leading to or concurrent with statistics study. One respondent indicated an introductory statistics course as a prerequisite. Comments included that it depends on the nature of the institution or the program; some said that it was mandated as an only course at the master's level; one response was that one course can do both.

Further, 42 said the course should be two semesters (or quarters) in length, while 49 said it should not. At one institution it is a one-semester course for master's students but two semesters for doctoral students. At another it is part of a five-quarter sequence; at still another, a four-quarter sequence.

Table 4
Frequencies for Demographic Items in Questionnaire Format

Do you currently teach a graduate introductory educational research course?

Yes 53 (55.8%) No 42 (44.2%)

If not currently teaching such a course, have you taught it within the past five years?

Yes 34 (35.8%) No 8 (8.4%)

How many years have you taught this course?

Less than 5 years	16 (16.8%)
5-10 years	21 (22.1%)
10-15 years	23 (24.2%)
More than 15 years	33 (34.7%)
[no response]	2 (2.1%)

Is your approach to teaching this course more oriented toward

qualitative research	5 (5.3%)
quantitative research	66 (69.5%)
both	24 (25.3%)

Please check the statement which best reflects your perception of a one-semester course in research.

40 (42.1%) As an only course in research methodology at the master's degree level to produce a consumer of research

46 (48.4%) As an introductory course to be followed by a course in statistics or a statistics course to be taken concurrently, leading to a research study or master's thesis

[9 (9.5%) No response]

Do you feel this should be a two-semester course?

Yes 42 (44.2%) No 49 (51.6%)

[No response 4 (4.2%)]

SIG: PER respondents were asked to indicate on their questionnaires "yes" or "no" depending upon whether the skill is required or not. A score was calculated for each respondent by tallying the number of "yes" responses checked on the list of 59 skills. A one-way ANOVA of scores by number of years having taught the course (see Table 4) was conducted, and yielded the following:

	n	$\bar{X}$	s
Less than 5 years	16	45.31	7.59
5-10 years	21	48.95	7.99
10-15 years	23	48.65	8.42
More than 15 years	33	51.24	6.05
No response	2		

No significant differences were found [$F(3, 89) = 2.35$] at $p < .05$, but at $p = .078$ instructors who have taught the course less than five years exhibited a mean score which was significantly lower than those who have taught it more than 15 years, according to the Scheffe follow-up test at $p < .10$.

Chi square analyses of demographic data displayed in Table 4 revealed only one statistically significant difference. More instructors who teach the course with a qualitative orientation or with both a qualitative and quantitative orientation indicated the course should be two semesters. Conversely, fewer "quantitative" instructors than would be expected by chance alone saw a need for a second semester ($X^2 = .27$; $p = .027$). At $p < .10$, instructors with more than 15 years experience teaching the course were <u>less</u> likely to indicate the course should be two semesters.

Discussion

There seems to be a stronger emphasis now than in the recent past toward a qualitative approach to research and this study may help to provide such evidence. Lincoln (1989) contended that there is in fact a paradigm revolution in progress, away from the positivistic/quantitative research methodology and toward a qualitative, more naturalistic or ethnographic research approach. McMillan and Schumacher (1989) now include two chapters on qualitative research instead of the one chapter in the previous edition. Vierra and Pollock (1988) devote about half of their new textbook to qualitative research approaches. Smith's (1987) article on publishing qualitative research in the AERJ has, without doubt, lent encouragement to those who grant credence and attribute validity to the methodology.

At best, some among this study's population apparently see a need for both--that the two approaches offer, in tandem, tools for a multifarious, more balanced approach in the quest for knowledge.

While this study does not reflect a random sample of what professors of educational research think should be taught in an introductory course, it does reflect what a respected group of professors believe should be included in the course and what they actually teach. Although the problem still exists of identifying a national randomly-selected sample, this study points to the need to explore what other small populations of professors of educational research feel about course requirements.

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Appendix A

Skills and Knowledge Areas

1. Understands what constitutes research
2. Understands what a scientific study involves
3. Can state a problem or question in such a way that it is amenable to the research process
4. Knows how to operationalize variables
5. Can identify questions or problem statements that do do not lend themselves to the scientific method of analysis.
6. Demonstrates an understanding of research terminology
7. Can converse confidently with others about the research process
8. Can conduct a review of related literature
9. Has familiarity with the CURRENT INDEX OF JOURNALS IN EDUCATION
10. Can use the THESAURUS OF ERIC DESCRIPTORS
11. Is familiar with the MONTHLY CATALOG OF U.S. GOVERNMENT PUBLICATIONS
12. Is familiar with the use of the MENTAL MEASUREMENTS YEARBOOKS
13. Can read journal articles and research reports with understanding
14. Can formulate a testable hypothesis
15. Understands the meaning of the null hypothesis and why it is written thus
16. Understands what is involved in the Experimental Method of solving a research problem
17. Has a knowledge of the types of variables that must be dealt with in a basic experimental design
18. Understands and can explain differences between true experiments and quasi-experiments
19. Has a knowledge of the various sampling procedures
20. Can use a table of random numbers
21. Can identify situations in which the Ex Post Facto approach would be appropriate
22. Knows when to use the Historical Method
23. Knows the difference between primary and secondary sources

cont.

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24. Has a familiarity with the various types of Descriptive Research Methods

25. Can construct questionnaires and opinionnaires

26. Knows the essential features of a cover letter to be used in a questionnaire study

27. Knows how to conduct a follow-up for a mailed questionnaire study

28. Can identify weaknesses in opinionnaire statements

29. Knows how to select a random sample

30. Is familiar with stratified and cluster samples

31. Is familiar with procedures to use to increase the rate of return for mailed questionnaires and opinionnaires

32. Can organize a set of data into a frequency distribution

33. Can draw a frequency polygon from a frequency distribution

34. Has an understanding of skewness

35. Is familiar with measures of central tendency and knows when it is appropriate to use each

36. Can calculate the mean from ungrouped data and from a frequency distribution

37. Can calculate the median from ungrouped data and from a frequency distribution

38. Has an understanding of variability in a distribution

39. Can calculate the quartile deviation

40. Has an understanding of the standard deviation

41. Can calculate the standard deviation from grouped and ungrouped data

42. Can convert raw scores to standard z-scores and T-scores

43. Can convert raw scores to percentiles and stanines

44. Understands the meaning of correlation

cont.

45. Can calculate a correlation coefficient using the Pearson r

46. Can calculate a Spearman Rank-Difference correlation

47. Knows when it is appropriate to use the Pearson r and the Spearman rho

48. Can construct a scattergram

49. Knows how to establish a regression line in a scattergram

50. Knows how to predict Y scores from X scores using the scattergram and regression line

51. Knows how to use the Standard Error of Estimate

52. Has an understanding of the concept of Type I and Type II errors

53. Has an understanding of and can interpret levels of significance

54. Has an understanding of the t-test

55. Can calculate from a small group of scores the t-ratio for an independent sample

56. Can calculate from a small group of scores the t-ratio for a non-independent sample

57. Has an understanding of the F-ratio

58. Can compute an F-ratio (simple Analysis of Variance) from samples of data

59. Has an understanding of the Chi-Square Test of Independence

60. Can calculate the chi-square from two sets of frequencies

61. Understands the concept of internal validity

62. Can describe the threats to internal validity

63. Has an understanding of how design arrangements can reduce threats to internal validity

64. Understands the concept of external validity

65. Can describe the threats to external validity

cont.

66. Has an understanding of validity and the various types of validity

67. Has an understanding of reliability and how it can be determined

68. Has an understanding of the Standard Error of Measurement and can calculate it

69. Knows the various components of a research proposal

70. Can actually write a research proposal including an organized review of related literature

71. Has an understanding of the basic ethical and legal considerations in conducting research

72. Has developed a familiarity with research-oriented periodicals in his/her own field or area of interest

73. Can critically evaluate a research report

74. Has become a more critical listener

75. Can interpret charts and graphs

76. Can interpret basic computer printouts

77. Can enter data in a microcomputer program and interpret results

PANEL MEMBERS ADDED THE FOLLOWING ITEMS DURING/AFTER ROUND I:

78. Understands the nature of objectivity/reality and its philosophical base

79. Appreciates the underlying assumptions/rationale of qualitative and quantitative methodologies

80. Understands how quantitative and qualitative research differ in philosophy and methodology

81. Understands the characteristics of good qualitative research

82. Has an understanding of ethnography and naturalistic inquiry

83. Knows the components of connoisseurship and portraiture as methods of investigation

84. Understands the differences between a scientific research report and a case study

cont.

85. Comprehends that scientific, technical knowledge in quantitative form is only one kind of useful knowledge

86. Understands case study methods and procedures

87. Can read and evaluate a case study (as well as a scientific research report)

88. Knows the strengths/limitations of journalistic inquiry

89. Has familiarity with phenomenological as well as positivistic inquiry and the basic assumptions of each

90. Knows the strengths/limitations of phenomenology as a research method

91. Knows the difference between observation and inference and can demonstrate each

92. Has some minimal knowledge of single-subject experimental designs

93. Can identify the type (method) of research represented by a particular study (experimental, etc.)

94. Can interpret bias in design and testing

95. Understands logic of analyzing variance in whatever form (ANOVA, r, R, ANCOVA, etc.)

96. Can interpret multiple regression, analysis of covariance, factorial designs, etc.

97. Can distinguish between a single-variable group design and a factorial design

98. Understands the nature of causation and causal linkages

99. Understands problems of direction of causality in correlational research

100. Understands the various methods for summarizing different research studies on the same problem, especially the method of meta-analysis

101. Understands importance of research replication

102. Understands the role of research in improving educational practice

103. Understands what knowledge is and how findings become knowledge

NEW ITEM 103 AS SUGGESTED:
"Understands how knowledge is generally defined, and how various paradigms find it problematic, and understands the historical and political forces which bring about the translation of research "findings" into "knowledge."

Cont.

104. Is familiar with basic research resources such as Encyclopedia of Educ. Research, Review of Educ. Research, Review of Research in Educ., and Handbook of Research on Teaching

105. Is familiar with basic research resources such as Psychological Abstracts, Sociological Abstracts, Social Sciences Citation Index, & Education Index

106. Has an understanding of the steps required to develop a test (vs. questionnaire) for use in research

107. Understands the logic underlying hypothesis testing

108. Can select a systematic sample

109. Can discuss why numerical analysis is useful

110. Is familiar with Woodbury's A Guide to Sources of Educational Information

THE FOLLOWING ITEMS WERE ADDED AS A RESULT OF PANEL MEMBERS' SPLITTING OF ITEMS FROM THE "STARTER" LIST OF 77 ITEMS.

(111) 36b. Can calculate the mean from a frequency distribution

(112) 41b. Can calculate the standard deviation from grouped data

(113) 47b. Knows when it is appropriate to use the Spearman rho

(114) 68b. Can calculate the Standard Error of Measurement

Desirable Skills and Knowledge Outcomes for an Introductory Educational Research Course: A Delphi Study

Robert F. Todd and Carol C. Reece
Memphis State University

The Twenty-one Members of the Delphi Panel

(presented alphabetically)

Donald Ary
David Berliner
Walter R. Borg
Patricia Busk
S. Alan Cohen
Patricia B. Elmore
Meredith D. Gall
L. R. Gay
Gene Glass
Kenneth D. Hopkins
Robert B. Ingle
David Krathwohl
Yvonna Lincoln
Barbara S. Plake
W. Todd Rogers
Robert Slavin
James Stone
Bruce Tuckman
Herbert J. Walberg
J. Robert Warmbrod
Paula Woehlke

Appendix C

QUESTIONNAIRE

Do you currently teach a graduate introductory educational research course? Yes_____ No_____

If not currently teaching such a course, have you taught it within the past five years? Yes_____ No_____

How many years have you taught this course?
Less than 5 years_____
5-10 years_____
10-15 years_____
More than 15 years_____

Is your approach to teaching this course more oriented toward
qualitative research_____
quantitative research_____
equally divided_____

Please check the statement which best reflects <u>your perception</u> of a one-semester course in research.

_____ As an <u>only</u> course in research methodology at the master's degree level to produce a consumer of research

_____ As an introductory course to be followed by a course in statistics or a statistics course to be taken concurrently, leading to a research study or a master's thesis

Do you feel this should be a two-semester course? Yes_____ No_____

The following definitions were provided the Delphi panel in order to gain uniformity in the decision process. They are reproduced here for the same purpose.

ESSENTIAL - Without this skill or knowledge an individual cannot be considered to have learned enough about the educational research process to be a consumer and/or producer of research

IMPORTANT - An individual should possess this skill or knowledge in order to evaluate the research of others. It should be given emphasis in an introductory research course.

Following is a list of the 59 skills and knowledge areas that the Delphi panel deemed Essential, Essential-Important, and Important. Please indicate by a check mark or an X in the column marked "Yes" and "No" those skills and knowledge areas that you require and do not require in your graduate introductory research course.

Appendix C (continued)

RESEARCH SKILLS AND KNOWLEDGE AREAS QUESTIONNAIRE

		Yes	No
1.	Understands what constitutes research		
2.	Understands what a scientific study involves		
3.	Can state a problem or question in such a way that it is amenable to the research process		
4.	Knows how to operationalize variables		
5.	Can identify questions or problem statements that do not lend themselves to the scientific method of analysis		
6.	Demonstrates an understanding of research terminology		
7.	Can converse confidently with others about the research process		
8.	Can conduct a review of related literature		
9.	Has familiarity with the CURRENT INDEX OF JOURNALS IN EDUCATION		
10.	Can use the THESAURUS OF ERIC DESCRIPTORS		
11.	Is familiar with the use of the MENTAL MEASUREMENTS YEARBOOK		
12.	Can read journal articles and research reports with understanding		
13.	Can formulate a testable hypothesis		
14.	Understands the meaning of the null hypothesis and why it is written thus		
15.	Understands what is involved in the Experimental Method of solving a research problem		
16.	Has a knowledge of the types of variables that must be dealt with in a basic experimental design		
17.	Understands and can explain differences between true experiments and quasi-experiments		
18.	Has a knowledge of the various sampling procedures		
19.	Can identify situations in which the Ex Post Facto approach would be appropriate		
20.	Knows the difference between primary and secondary sources		
21.	Has a familiarity with the various types of Descriptive Research Methods		

Appendix C (continued)

		Yes	No
22.	Can identify weaknesses in opinionnaire statements		
23.	Knows how to select a random sample		
24.	Is familiar with measures of central tendency and knows when it is appropriate to use each		
25.	Has an understanding of variability in a distribution		
26.	Has an understanding of the standard deviation		
27.	Understands the meaning of correlation		
28.	Has an understanding of the concept of Type I and Type II errors		
29.	Has an understanding of and can interpret levels of significance		
30.	Has an understanding of the t-test		
31.	Has an understanding of the F-ratio		
32.	Has an understanding of the Chi-Square Test of Independence		
33.	Understands the concept of internal validity		
34.	Can describe the threats to internal validity		
35.	Has an understanding of how design arrangements can reduce threats to internal validity		
36.	Understands the concept of external validity		
37.	Can describe the threats to external validity		
38.	Has an understanding of validity and the various types of validity		
39.	Has an understanding of reliability and how it can be determined		
40.	Knows the various components of a research proposal		
41.	Can actually write a research proposal including an organized review of related literature		
42.	Has an understanding of the basic ethical and legal considerations in conducting research		
43.	Has developed a familiarity with research-oriented periodicals in his/her own field or area of interest		
44.	Can critically evaluate a research report		

		Yes	No
45.	Has become a more critical listener		
46.	Can interpret charts and graphs		
47.	Appreciates the underlying assumptions/rationale of qualitative and quantitative methodologies		
48.	Can identify the type (method) of research represented by a particular study (experimental, etc.)		
49.	Can interpret bias in design and testing		
50.	Can distinguish between a single-variable group design and a factorial design		
51.	Understands the nature of causation and causal linkages		
52.	Understands problems of direction of causality in correlational research		
53.	Understands the various methods for summarizing different research studies on the same problem, especially the method of meta-analysis		
54.	Understands importance of research replication		
55.	Understands the role of research in improving educational practice		
56.	Is familiar with basic research resources such as Encyclopedia of Educ. Research, Review of Educ. Res., Review of Res. in Educ., and Handbook of Research on Teach.		
57.	Is familiar with basic research resources such as Psychological Abstracts, Sociological Abstracts, Social Sciences Citation Index, & Education Index		
58.	Understands the logic underlying hypothesis testing		
59.	Can discuss why numerical analysis is useful		

If you would like a copy of the summary of the results of this study, please make a check mark in this blank _____.